

Openbaar gemaakt
den 12. APR. 1917

104,733

PATENT



SPECIFICATION

Application Date, Mar. 15, 1916. No. 3869/16.

Complete Left, Aug. 29, 1916.

Complete Accepted, Mar. 15, 1917.

PROVISIONAL SPECIFICATION.

Improvements in Stationary Contacts for Electric Switches or
Circuit Breakers.

I, FREDERICK BRERETON HOLT, of Greenfield Farm, Antrobus, near Northwich, in the County of Chester, Electrical Engineer, do hereby declare the nature of this invention to be as follows:—

This invention relates to electric switches and circuit breakers and in particular to fixed contacts for these devices which are made of metal strip bent to substantially a U-shape, the parallel limbs of the strip passing through the switch base or support so as to be connected to circuit conductors on the side of the base remote from the operative face of the contact. Contacts of this description are described in the Specifications of British Letters Patent numbered 28,746 of 1913 and 3001 of 1915.

The present invention has for its object to improve and cheapen the construction of these contacts, to increase the insulation of the contact from the base and further, in the case of oil switches, to provide for carrying the insulation below the level of the oil so as to prevent any possibility of short-circuiting taking place between adjacent contacts along the oil surface.

In carrying out the invention the parallel limbs of the contact are brought close together so as to pass through a single orifice in the switch base and they may, if desired, be surrounded with an insulating sleeve at this point. The following construction is employed for clamping the contact firmly to the sleeve and for preventing it moving relatively to the switch base. Two clamps are provided outside of the insulating sleeve with transverse bolts arranged to draw the parallel limbs of the contact together and at this point between said parallel limbs one or more roughened pieces of metal or other suitable means such as a piece of metal with projections fitted to correspond with recesses in the parallel limbs may be provided so that as the clamping bolts are screwed up the limbs of the contact will be gripped between said pieces of metal and the clamping jaws, the insulating sleeve yielding sufficiently to permit the pressure to be transmitted therethrough. The clamps may then be bolted to the switch base by bolts passing in a direction perpendicular to the transverse clamping bolts and the contact with its insulating sleeve may thus be firmly and securely attached to the switch base.

This method of securing the clamps to the contacts for the purpose of attaching the latter to the switch base may obviously be used where an insulating sleeve is not provided.

Where the insulating sleeve is of an unyielding and rigid material, such as porcelain for example, which is not adapted to transmit pressure from the

[Price 6d.]

clamps to the contact strip, the following construction is adopted. Clamps are provided at each end of the sleeve, those at one end having secured thereto steel knife edges which cut into the contact strips when the clamping jaws are drawn together. The contact strips in this case may, or may not, be provided with distance pieces of roughened metal as hereinbefore described, but where these pieces are omitted the strips will be brought into close contact or separated by a strip of paper if desired so as to reduce the eddy current losses in the contacts. After one pair of clamps have been firmly secured to the contact the insulating sleeve is slipped on, then preferably a spring washer and finally a second clamp, the jaws of which are first loosely drawn together and then bolts passing longitudinally through the sleeve and through both clamps are screwed up to draw the clamps together and firmly grip the sleeve so as to securely attach it to the contact strips. The second clamp is finally tightened up to the contact strips in its turn. The attachment of the insulating sleeve to the switch base may be carried out in the ordinary manner and needs no description.

It is convenient with insulating sleeves for high voltages to make them of cylindrical form. In such a case where the contact is made of two or more strips placed side by side so as to give the necessary contact area, said strips are bent and their parallel limbs are interlaced so as to avoid losses due to skin effect in the contacts when used for alternating current circuits especially when these are of large capacity. When used for oil switches the insulating sleeve may conveniently be made sufficiently long to dip below the surface of the oil and thereby prevent the possibility of short-circuits between adjacent contacts.

Dated the 15th day of March, 1916.

F. W. LE TAILL,
Chartered Patent Agent,
2, Norfolk Street, Strand, London, W.C.,
Agent for the Applicant.

COMPLETE SPECIFICATION.

Improvements in Stationary Contacts for Electric Switches or Circuit Breakers.

I, FREDERICK BRERETON HOLT, of Greenfield Farm, Antrobus, near Northwich, in the County of Chester, Electrical Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to electric switches and circuit breakers and in particular to fixed contacts for these devices which are made of metal strip bent to substantially a U-shape, the parallel limbs of the strip passing through the switch base or support so as to be connected to circuit conductors on the side of the base remote from the operative face of the contact. Contacts of this description are described in the Specifications of British Letters Patent numbered 28,746 of 1913 and 3001 of 1915.

The present invention has for its object to improve and cheapen the construction of these contacts, to increase the insulation of the contact from the base and further, in the case of oil switches, to provide for carrying the insulation below the level of the oil so as to prevent any possibility of short-circuiting taking place between adjacent contacts along the oil surface.

In order that the nature of the invention may be clearly understood it will now be described with reference to the accompanying drawing, in which Fig. 1 is a view in elevation of one form of fixed contact constructed in accordance with the invention. Fig. 2 is a similar view of the same taken at right angles to Fig. 1. Fig. 3 is an elevation and Fig. 4 a plan of a detail hereinafter explained. Fig. 5 is an elevation partly sectional; Fig. 6 is a sectional view on the line VI—VI of Fig. 5 and Fig. 7 is a section on the line VII—VII of Fig. 5 illustrating another embodiment of the invention. Figs. 8 and 9 are views hereinafter explained of parts of the construction shown in Figs. 5 and 6. Figs. 7 to 9 are drawn to an enlarged scale.

Referring now to Figs. 1 to 4, the contact consists of a number of strips 1, 2, 3, 4, 5 placed side by side bent to a U-shape and having their parallel limbs 6 to 10 brought close together so as to pass through a single orifice in the switch base 11. Said limbs 6 to 10 are surrounded by a sleeve 12 of insulation, such as micanite for example, and two clamps 13, 14 of a channel shape in cross section, one on either side of the sleeve 12, are provided with bolts 15, 16 by means of which the sleeve and strips are clamped firmly together. The edges 17 of the clamps are carefully rounded where they engage with the sleeve 12 and between the parallel limbs of the strips roughened plates of metal 18 are provided, so that as the clamping bolts 15, 16 are screwed up the parallel limbs of the contact will be gripped between said plates and the clamps, the insulating sleeve yielding sufficiently to permit the pressure to be transmitted therethrough. One of the pieces of metal 18 is shown in elevation and plan in Figs. 3 and 4 respectively. The clamps 13 and 14 are bolted to the switch base 11 by bolts 19 by which means the contact with its insulating sleeve is firmly and securely attached to said base.

This method of securing the clamps to the contact for the purpose of attaching the latter to the switch base may be used where an insulating sleeve is not provided in which the edges 17 of the clamps need not be rounded and the plates 18 may be omitted if desired.

In Figs. 5, 6, 7, 8 and 9 the invention is shown applied to a contact provided with a sleeve of unyielding and rigid material, such as porcelain for example, which is not adapted to transmit pressure from the clamps to the strips forming the contact. In the particular design illustrated which is adapted for use where a substantially cylindrical sleeve having a cylindrical bore is employed each contact consists of three strips 20, 21, 22 and the parallel limbs of the strips are bent in such a manner as to conveniently fit within the cylindrical bore. As shown, the middle strip 21 is provided with straight limbs, the outer strips 20, 22 having the parallel limbs bent inwards so as to lie alongside those of the middle strip. The insulating sleeve 23 is supported from the switch base by means of a supporting ring 24 secured thereto in any suitable and well known manner. At the ends of the sleeve caps or washers 25, 26 are provided, a plan view of the washer 26 being shown in Fig. 8 in which 27 is a rectangular orifice through which the parallel limbs of the strips 20, 21, 22 are passed. Substantially U-shaped clamps 28, 29 and 30, 31 of similar form are provided at each end of the sleeve, those at the lower end, a plan view of which is shown in Fig. 9, being provided with a pair of steel knife edged plates 32 secured by screws 33 or other suitable means so that the strips are firmly gripped between said plates when the transverse bolts 34 are screwed up. Said clamps 30 and 31 at the lower end of the sleeve are furthermore provided with pins 35 which engage with a transverse recess 36 in the lower end of said sleeve so as to prevent rotation of the contact relatively thereto, the washer 25 being suitably bent to fit said transverse channel. In assembling the parts, the lower clamp is preferably secured in position on the contact, the parallel limbs are then passed through the insulating sleeve 23 and the washer 26 at the upper end thereof, a spring washer 37 is then placed in position and the upper pair of clamps 28, 29 loosely slipped over the ends

of the parallel strips; longitudinal bolts 38, 39 passing through suitable orifices 40 in the upper and lower clamps are then tightened so that the sleeve is firmly gripped between said clamps after which the transverse bolts 34 of the upper pair of clamps are tightened on the strips holding the same firmly in place.

In the arrangement shown in Figs. 5 and 6 plates of roughened metal similar to those described with reference to Figs. 1 and 2, and shown in Figs. 3 and 4, may be provided between the contact strips, and in either form where these pieces are omitted the strips will be brought into close contact but may be separated by strips of paper so as to reduce the eddy current losses in the contacts. Where the contacts are to be employed in alternating current circuits and especially when these are of large capacity, the parallel limbs of the strips may be interlaced so as to avoid losses due to skin effect. In cases where the contacts are designed for oil switches the insulating sleeve 12 in Fig. 1 and 23 in Fig. 5 may be conveniently made sufficiently long to dip below the surface of the oil and thereby prevent the possibility of short circuits between adjacent contacts.

The number and dimensions of the strips forming a contact will obviously depend on the required current carrying capacity and the invention is not limited to the number shown.

The contacts may and usually will be provided with auxiliary contacts of a suitable type and it will be understood that the invention is not limited to contacts in which the strips are bent to the precise shape shown in the drawings.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. For electric switches and circuit breakers, fixed contacts made of metal strips which are bent so as to form two or more parallel limbs passing through a single orifice in the switch base or support, said parallel limbs being clamped together by clamps provided with clamping bolts in a direction perpendicular to the axis of the parallel limbs of the contacts.

2. For a switch or circuit breaker a fixed contact formed of strips and secured to the base or support substantially as described and shown in Figs. 1 and 2 of the accompanying drawing either with or without the insulating sleeve 12 and with or without the distance pieces 18.

3. For a switch or circuit breaker, a fixed contact constructed substantially as described with reference to Figs. 5 to 9 of the accompanying drawings.

Dated the Twenty-ninth day of August, 1916.

F. W. LE TALL,
Chartered Patent Agent,
2, Norfolk Street, Strand, London, W.C.,
Agent for the Applicant.